



Vocabulary

Review

1. Identify four *isometries* on the lines below.

T _____, R _____, R _____, G _____

2. Circle the correct answer to complete the sentence.

A *mapping* that results in a change in the position, size, or shape of a geometric figure is called a/n isometry / congruence / transformation .

Vocabulary Builder

Scale factor of a dilation (noun) SKĀL FAK tər dī LĀ tion

Related Words: dilation, center of a dilation, reduction, enlargement

Definition: The **scale factor of a dilation** is the ratio of a length of the preimage to the corresponding length in the image, with the image length always in the numerator.

Example: If the **scale factor of a dilation** is greater than one, the dilation is an enlargement. If the **scale factor** is less than one, the dilation is a reduction.

Use Your Vocabulary

3. Which of the following shows a dilation?

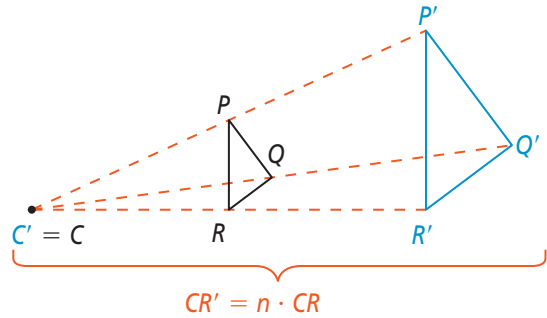


4. When a figure is transformed by a congruence transformation, what is true about the corresponding angles and the corresponding sides of the image and preimage?

Key Concept Dilation

A **dilation** with **center of dilation** C and scale factor n , $n > 0$, can be written as $D_{(n, C)}$. A dilation is a transformation with the following properties:

- The image of C is itself (that is, $C' = C$).
- For any other point R , R' is on \overrightarrow{CR} and $CR' = n \cdot CR$, or $n = \frac{CR'}{CR}$.
- Dilations preserve angle measure.



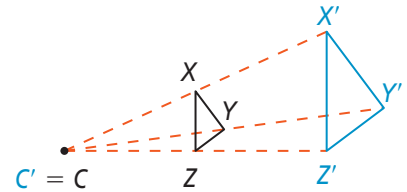
5. Circle the equation that is true for the dilation shown to the right.

$$n = \frac{CX}{CX'}$$

$$n = \frac{CX'}{CX}$$

$$n = \frac{CY}{CY'}$$

$$n = \frac{CY'}{CY}$$



Problem 1 Finding a Scale Factor

Got It? Is $D(n, O)(JKLM) = J'K'L'M'$ an enlargement or a reduction? What is the scale factor of the dilation?

Underline the correct choice to complete the sentence.

6. The image $J'K'L'M'$ is larger / smaller than the preimage $JKLM$.

7. The image $J'K'L'M'$ is a(n) enlargement / reduction.

8. Fill in the blanks to identify the coordinates of the preimage $JKLM$.

$J(\quad, \quad)$, $K(\quad, \quad)$, $L(\quad, \quad)$, $M(\quad, \quad)$,

9. Fill in the blanks to identify the coordinates of the image $J'K'L'M'$.

$J'(\quad, \quad)$, $K'(\quad, \quad)$, $L'(\quad, \quad)$, $M'(\quad, \quad)$,

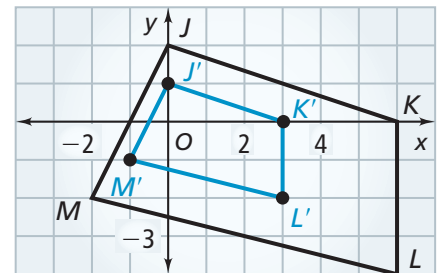
10. Use the distance formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ to find the lengths of the corresponding sides of the preimage JK and the image $J'K'$ in simplest radical form. Fill in the blanks.

$$JK = \sqrt{(\quad - \quad)^2 + (\quad - \quad)^2} = \quad \sqrt{\quad}$$

$$J'K' = \sqrt{(\quad - \quad)^2 + (\quad - \quad)^2} = \sqrt{\quad}$$

11. Fill in the blanks to complete the sentence.

The scale factor of the dilation is $n = \frac{J'K'}{JK} = \frac{\quad}{\quad} = \quad$





Problem 2 Finding a Dilation Image

Got It? What are the coordinates of the vertices of $D_{\frac{1}{2}}(\triangle PZG)$?

Fill in the blanks to complete the sentence.

12. The center of the dilation is the and the scale factor is .

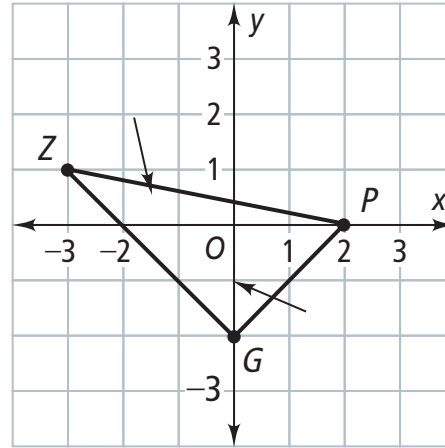
Underline the correct word to complete the sentence.

13. Because the scale factor is less than 1, the dilation is a(n) enlargement / reduction.
14. Use $D_{\frac{1}{2}}(x, y) = \left(\frac{1}{2}x, \frac{1}{2}y\right)$ to find the coordinates of each image vertex and plot $\triangle P'Z'G'$.

$$D_{\frac{1}{2}}(P) = \left(\frac{1}{2} \cdot \text{}, \frac{1}{2} \cdot \text{}\right); \text{ or } P'(\text{}, \text{})$$

$$D_{\frac{1}{2}}(Z) = \left(\frac{1}{2} \cdot \text{}, \frac{1}{2} \cdot \text{}\right); \text{ or } Z'(\text{}, \text{})$$

$$D_{\frac{1}{2}}(G) = \left(\frac{1}{2} \cdot \text{}, \frac{1}{2} \cdot \text{}\right); \text{ or } G'(\text{}, \text{})$$



Problem 3 Using a Scale Factor to Find a Length

Got It? The height of a document on your computer screen is 20.4 cm. When you change the zoom setting on your screen from 100% to 25%, the new image of your document is a dilation of the previous image with scale factor 0.25. What is the height of the new image?

Underline the correct word to complete the sentence.

15. Because the scale factor is 0.25, the dilation is a(n) enlargement/reduction.

Fill in the blanks to complete the statements.

16. A scale factor of 0.25 tells you that the ratio of the image length to the actual length is 0.25.

$$\frac{\text{}}{\text{actual length}} = \text{}$$

So, image length = scale factor \cdot actual length

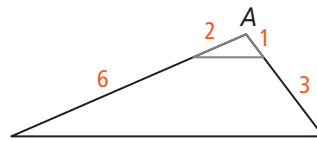
$$= \text{} \cdot \text{}$$

$$= \text{ cm}$$



Lesson Check • Do you UNDERSTAND?

Error Analysis The gray figure is a dilation image of the black figure for a dilation with center A . A student made an error when asked to find the scale factor. Explain and correct the error.



$$n = \frac{2}{6} = \frac{1}{3}$$

Use the diagram to complete Exercises 17 to 22.

17. Circle the image.

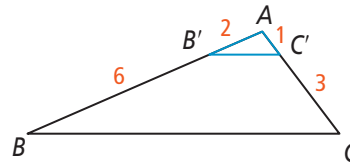
$\triangle AB'C'$

$\triangle ABC$

18. Circle the preimage.

$\triangle AB'C'$

$\triangle ABC$



19. Draw line segments to identify three pairs of corresponding sides of the image and the preimage.

AB AC'

AC $B'C'$

BC AB'

Fill in the blanks to complete the statements.

20. Find the side lengths.

$AB' =$

$AC' =$

$AB =$

$AC =$

21. Find the scale factor for two pairs of corresponding sides.

$$n = \frac{AB'}{AB} = \frac{\text{ }}{\text{ }} = \frac{\text{ }}{\text{ }}$$

$$n = \frac{AC'}{AC} = \frac{\text{ }}{\text{ }}$$

22. Explain and correct the error on the line below.



Math Success

Check off the vocabulary words that you understand.

☐ dilation

☐ center of dilation

☐ scale factor of a dilation

☐ enlargement

☐ reduction

Rate how well you can use *dilations*.

Need to review



Now I get it!